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## Notes on *Tornaria*-larvae from Akkeshi Bay<sup>1)</sup>

*With 2 Text-figures*

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*(Communicated by T. UCHIDA)*

Several years ago two *Tornaria*-larvae were found among plankton organisms from Akkeshi Bay. They were collected at separate times, one being very young and the other in the stage of metamorphosis. Several forms of *Tornaria* have been recorded from middle and southern Japanese waters, but none has as yet been known from northern Japanese waters.

We are very grateful to Professor Tohru Uchida for his valuable suggestions and for reading the manuscript. We are also indebted to Mr. K. Kubo who placed a specimen collected by him at our disposal.

### Young *Tornaria*

A specimen of young *Tornaria*-larva was found among plankton organisms collected by Mr. K. Kubo from Akkeshi Bay on August 20, 1947. The body is transparent and elongate bell-shaped. It attains 0.94 mm in height, 0.5 mm in breadth in anterior expansion and 0.6 mm in posterior expansion. The larva corresponds to Metschnikoff's Stage of Stiasny's classification and seems to be about 7–10 days old. The apical plate, present at the top of the body, is provided with a pair of dark brown eye-spots and bears a tuft of rather long apical cilia. There is a non-tentaculated longitudinal ciliary band which is differentiated into preoral and postoral loops. The oral area is spacious. The upper dorsal lobe is not high. The lateral lobe is absent and there is a broad saddle at the place of the lateral lobe. The ventral saddle is broad and very low. The lower dorsal lobe is rather deep. A circular ciliary band, which is conspicuous and consists of long cilia, encircles the lower part of the body. A secondary circular ciliary band is located at a more posterior region, and there is a tuft of cilia at the posterior end. The mouth opens ventrally slightly above the middle of the body. The alimentary canal consists of three regions; oesophagus, stomach and

1) Contributions from the Akkeshi Marine Biological Station, No. 69.

intestine. The mouth is followed by a curved, ciliated oesophagus, which is separated from the stomach by a diaphragm. The stomach is very spacious and bottle-shaped and occupies the greater part of the posterior half of the body. At the entrance of the stomach there is the region named the "gastric pad," which bears long cilia. The intestine is small, spindle-shaped and separated from the stomach by a strict constriction. It ends in the anus. Paired rudiments of the trunk-coelom are present along the lateral wall of the posterior part of the stomach. The narrow and rather long apical string hangs down from the apical plate and is connected with a rather large hydrocoelom near the dorsal neck of the stomach. The hydrocoelom extends to the water-pore which opens at the dorsal surface slightly over the middle of the body. The rudiment of the collar-coelom is not yet developed. The living specimen rotates spirally by beating of the cilia of the circular ciliary band.

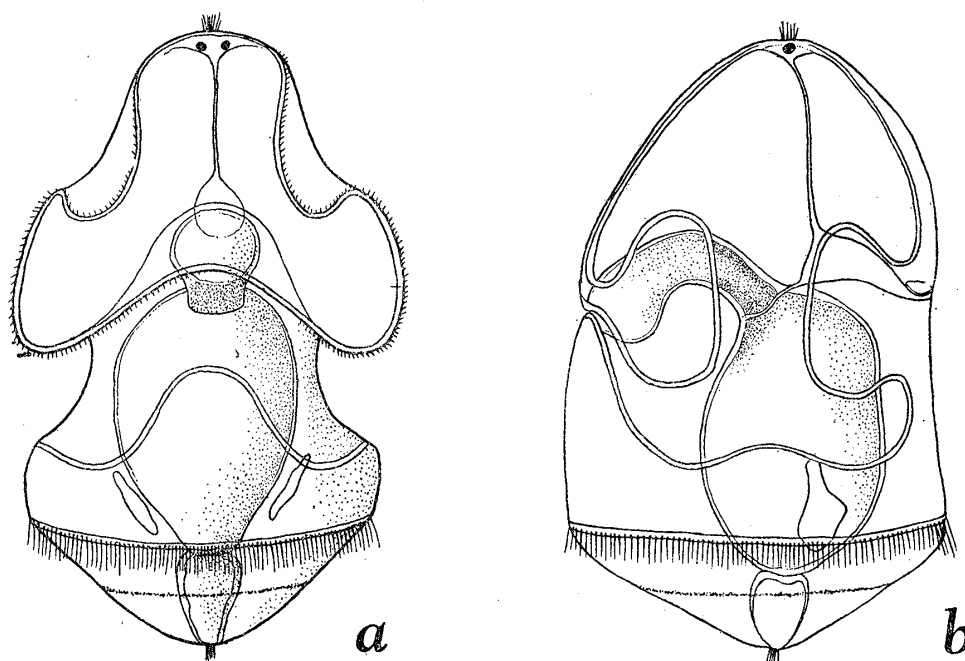


Fig. 1. Young *Tornaria* from Akkeshi Bay. a, Ventral view. b, Lateral view.  $\times 75$ .

This young *Tornaria* is non-tentaculated. Two non-tentaculated *Tornaria*-larvae, viz. *Tor. mortenseni* Stiasny and *Tor. ijimai* Stiasny, have been known from Japanese waters. The present specimen is closely similar in its morphology to the larva which Miyashita (1925) described as *Tor. mortenseni* from Misaki. *Tor. mortenseni* was originally described by Stiasny (1921) on the basis of materials collected by Mortensen from Misaki. Miyashita observed the development of an enteropneust and identified the obtained larva with *Tor. mortenseni*. Stiasny (1928) doubted, however, whether Miyashita's materials were exactly identical with *Tor. mortenseni*, and later (1934) he noted that *Tor. mortenseni* seems to be not a good species and may possibly be merely a young stage of other species

of *Tornaria*. Now that the following Krohn's stage has not been observed, the present specimen has been here provisionally referred to *Tor. mortenseni*.

### Metamorphosing *Tornaria*

A specimen of metamorphosing *Tornaria* was collected in Akkeshi Bay among plankton organisms in September, 1946.

It is in the Metamorphosing Stage of Stiasny's classification. The body is translucent and elongated bottle-shaped, with a slight constriction at the region somewhat anterior to the middle of the body. While the anterior part of the body is conical, the posterior, trunk region is prolonged, tapering gradually and having a blunt end. The middle of the body is slightly expanded. The body measures 1.66 mm in length and 0.74 mm in breadth at the body expansion. The longitudinal ciliary band is entirely absent but the circular ciliary bands remain active. The main circular ciliary band is very conspicuous and encircles the body at the region of the circular body constriction. The secondary circular ciliary band is present near the posterior end. The mouth opens ventrally just below the constriction of the body. The oesophagus is short. The stomach is cylindrical and not so spacious as in the young *Tornaria* described above. The intestine is indistinct. There is a pair of horse-shoe-shaped gill-slits just behind the main circular ciliary band. There are no eye-spots.

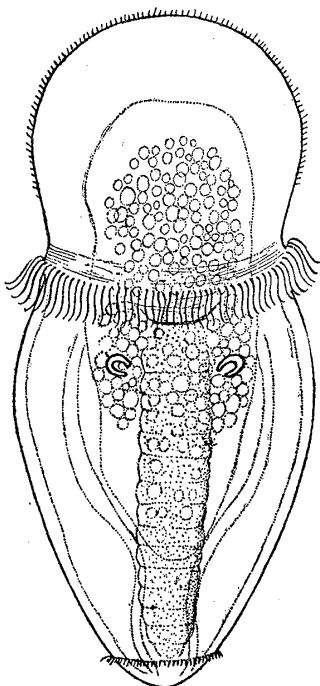


Fig. 2. Metamorphosing *Tornaria* from Akkeshi Bay. Dorsal view.  $\times 45$ .

Whether this metamorphosing *Tornaria* belongs to the same species as the preceding young *Tornaria* is impossible to determine at present. We are, however, inclined to think that these two *Tornaria* are probably different stages of the same worm, judging from their collecting dates and

locality.

To what species of the enteropneusts do the present *Tornaria* larvae belong? This cannot be answered certainly at present. *Tornaria mortenseni* was regarded by Stiasny (1921, 1934) as the larva of *Glandiceps hacksi* (Marion), which was recorded from Yokohama and from near Nagoya. Miyashita, studying his material as a species of *Ptychodera*<sup>2)</sup>, reported that the developmental process up to his *Tor. mortenseni* stage was very similar to that of a European species, *Balanoglossus clavigerus* Delle Chiaje. In Akkeshi Bay only one specimen of an enteropneust has been collected and it was recently shown by us to be a new

2) The genus *Ptychodera* is now defined to a narrower group, hence the species used by Miyashita must be eligible for a different genus.

species of *Saccoglossus*. As the species of *Saccoglossus* does not pass through the *Tornaria*-larva but develops directly, it is probable that another enteropneust of a different genus dwells in Akkeshi Bay.

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